What is claimed is:

1. A separator for electrochemical cells comprising a porous carrier which comprises woven or non-woven polymeric fibers having on and in this carrier a porous inorganic nonelectroconductive coating comprising particles having an average particle size in the range from 0.5 to 10 µm which are adhered to each other and to the carrier by an inorganic adhesive,
characterized in that
the inorganic coating comprises from 75 to 99 parts by mass of one or more oxidic particles of the elements Al, Si and/or Zr having an average particle size in the range from 0.5 to 10 µm and from 1 to 25 parts by mass of particles having an average particle size in the range from 0.5 to 10 µm of at least one zeolite.

2. A separator as per claim 1,
characterized in that
the zeolites in the zeolite particles are in the Na^+ or Li^+ form.

3. A separator as per claim 1 or 2,
characterized in that
the carrier is flexible and less than 50 µm in thickness.

4. A separator according to claim 3,
characterized in that
the carrier is a polymeric nonwoven.

5. A separator according to at least one of claims 1 to 4,
characterized in that
the polymeric fibers of the carrier are selected from fibers of polyacrylonitrile, polyamide, polyester and/or polyolefin.

6. A separator according to at least one of claims 1 to 5,
characterized in that

the inorganic adhesives are selected from oxides of the elements Al, Si and/or Zr.

7. A separator as per at least one of claims 1 to 6,
characterized in that
the inorganic adhesive comprises particles having an average particle size of less than 20 nm and was prepared via a particulate sol or comprises an inorganic network of oxides which was prepared via a polymeric sol.

8. A separator as per at least one of claims 1 to 7,
characterized in that
it further comprises an inorganic network comprising silicon, the silicon of the network being bonded via oxygen atoms to the oxides of the inorganic coating and via an organic radical to the carrier which comprises polymeric fibers.

9. A separator as per at least one of claims 1 to 8,
characterized in that
the zeolite particles present are particles selected from the zeolites Zeolite-A, Zeolite-Y, Zeolite-USY, ZSM-5 or ZSM-9.

10. A process for producing a separator as per at least one of claims 1 to 9,
characterized in that comprises steps of
a carrier which comprises woven or non-woven polymeric fibers being provided with a ceramic coating by a suspension being applied onto and into the carrier and being solidified on and in the carrier by at least single heating, the suspension comprising a sol and at least two fractions of particles of which the first fraction comprises oxidic particles having an average particle size in the range from 0.5 to 10 µm selected from the oxides of the elements Al, Zr and/or Si and comprises from 75 to 99 parts by mass and of which the second fraction comprises zeolite particles having an average particle size in the range from 0.5 to 10 µm and comprises from 1 to 25 parts by mass.

11. A process according to claim 10,
characterized in that

an adhesion promoter selected from the organofunctional silanes is added to the suspension before it is applied to the carrier.

12. A process according to claim 11,
characterized in that
the adhesion promoter has been selected from 3-aminopropyltriethoxysilane, 2-aminoethyl-3-aminopropyltrimethoxysilane, 3-glycidyloxytrimethoxysilane, 3-methacryloyloxypropyltrimethoxysilane, vinyltriethoxysilane, vinyltrimethoxysilane and vinyltris(2-methoxyethoxy)silane.

13. A process according to at least one of claims 10 to 12,
characterized in that
the suspension is applied onto and into the carrier by printing on, pressing on, pressing in, rolling on, knifecoating on, spreadcoating on, dipping, spraying or pouring on.

14. A process according to at least one of claims 10 to 13,
characterized in that
the carrier used is a polymeric nonwoven which comprises fibers selected from polyacrylonitrile, polyester, polyamide and/or polyolefin.

15. A process according to at least one of claims 10 to 14,
characterized in that
the suspension comprises at least one sol of a compound of the elements Al, Si, or Zr and is prepared by suspending the particles in at least one of these sols.

16. A process according to claim 15,
characterized in that
the sols are obtained by hydrolyzing a precursor compound of the elements Al, Zr or Si with water or with a water-diluted acid.

17. A process according to claim 15,
characterized in that

the suspension comprises a polymeric sol of a compound of silicon.

18. A process according to claim 16 or 17,
characterized in that
the sols are obtained by hydrolyzing a compound of the elements Al, Zr or Si with water or an acid or a combination thereof, the compounds being present dissolved in an anhydrous solvent and being hydrolyzed with from 0.1 to 100 times the molar ratio of water.

19. A process according to at least one of claims 10 to 18,
characterized in that
the suspension present on and in the carrier is solidified by heating at from 50 to 350°C.

20. A process according to claim 19,
characterized in that
on a polymeric nonwoven comprising polyester fibers the suspension is heated at a temperature in the range from 200 to 220°C for from 0.5 to 10 minutes.

21. A process according to claim 19,
characterized in that
on a polymeric nonwoven comprising polyamide fibers the suspension is heated at a temperature in the range from 130 to 180°C for from 0.5 to 10 minutes.

22. The use of a separator as per at least one of claims 1 to 9 as a separator in batteries.

23. A lithium battery comprising a separator as per at least one of claims 1 to 9.